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Interpretation of Groupware Effect in an Organization using Structuration Theory

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Abstract **The need for appropriate interpretative and evaluative frameworks for understanding groupware and related technologies is discussed. Structuration is employed to examine some aspects of an implementation of groupware within one organization and various interpretative outcomes developed.**

I. Introduction

Increasingly, organizations take for granted the benefits of information technologies introduced to provide electronic forms of communication and co-ordination between groups of staff. The assumed benefits of these technologies include more flexible working, the potential to build what are called 'virtual teams' and to improve knowledge management within the organization, Bannon [2], Ciborra and Patriotta [8], Orlikowski [20],[21]. At the same time researchers are addressing the need to improve methods of evaluation for information systems and technologies, Hares and Royle [13], Remenyi, Sherwood-Smith and White [23], with the implicit rationale that such technologies do not always deliver easily identified benefits.

The approach taken to evaluating the effect of groupware and network technologies, including internet technologies, reflects an underlying rationale adopted by the worker concerned. So, for example, there is a significant body of research which adopts a socio-technical approach, with the implicit assumption that design of the system can be optimized in conjunction with the human activity components to ensure the organization's objectives are achieved. This is the approach adopted by and described in, for example, Avison and Wood Harper [1], Mumford [19], Kunda and Brooks [18]. In contrast to this are approaches that stress an interpretative analysis of information systems, setting them in the context of organizational change and treating them as affectors (potentially generators) of organizational and social potential Walsham [26]. To an extent it is felt these workers are interested in describing and interpreting phenomena as a *prelude* to achieving beneficial action in relation to organizational information systems. Whilst this is a useful activity in and of itself, it cannot affect the actual process of information systems implementation and benefits realisation directly. Other workers agendas, e.g. Orlikowski [21], Bannon [2], Ciborra and Patriotta [8]), present as an active attempt to understand how emerging information technologies may be employed effectively.

Complementary to these perspectives, a holistic or systems approach offers a view in relation to the effect of new information systems and technology since it might be expected to include both technological and social potentials. The work reported in this paper employs the theory of structuration, Giddens [12], to frame and discuss the effect created by new information technologies within an organization in terms of the capabilities and potentials introduced to the existing system(s) and social structures.

II. The Perspective of Structuration

Systems perspectives, methods and systemic analyses are typically based upon an abstracted view of the system of interest. Soft Systems Methodology (SSM) emerges from the 'process' world view of hard systems analysis in that conceptual models, developed from root definitions, parallel the abstraction processes in engineering design, Checkland [6], Checkland and Scholes [7]. SSM differs from hard systems analysis by the possibility of developing alternative perspectives through alternative root definitions. Learning is also incorporated as an important part of SSM, but, in the end, a choice of feasible action needs to be taken.

It is possible to consider groupware implementation using SSM amongst many systems approaches. Thus, in considering the introduction of new technology, a variety of systemic identities could be explored, the potentials introduced by the technology would be incorporated into conceptual models which could lead to the adoption of appropriate technical solutions and practices aimed at bringing about the desired effect. This implicitly iterative process could be aimed at growth in use of the technology towards agreed beneficial outcomes. An alternative might be to adopt a model such as the Viable System Model, employing it as a diagnostic tool to identify areas where technology could facilitate improved variety management and conformation towards improved viable system design Beer [3], [4].

A further approach, still seeking an holistic (systemic) understanding, is to consider the perspective of an individual working within an organization. This individual is an actor involved in bringing about many transformations in SSM terms, thus forming a part in many systems (holons), Checkland and Scholes [7]. In any organization the actor has a choice of what to do but the choice is a constrained one by virtue of the actors participation within the organization.

However, the organization does not have total power to determine what the choice(s) of an actor will be in a particular circumstance; and many commentators consider that the actor and the systems or organizations with which she or he interact should be considered holistically. Notably Giddens, in the development of structuration theory, insists upon an action/structure duality; the actor by virtue of interaction with the organization being both constrained by and, in a sense, creating the structure(s) of the organization Giddens [12]. For Giddens this is bought about by modalities which link particular types of interaction with particular structural elements. The three key types of modality are *interpretative sch*emes, *facilities* and *norms*. This is shown diagrammatically in *Figure 1*.

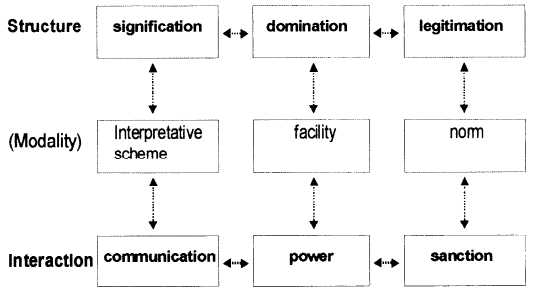

Figure 1, Adapted from (Giddens, 1984, page 29).

To expand upon this scheme, the structure element relating to interpretation is signification. Signification has the ability through the modality of an interpretative scheme to affect the way in which communication interactions are performed. But also, communicative actions can through interpretative schemes, change the form of signification. A simple example of this might be the way in which an Email message is interpreted by the receiver and sender, leading, over time, to development of a protocol for use.

The value of structuration theory in considering information systems in organizations has been discussed, by Walsham [26]. Noting firstly the contextualist approach, which emphasizes the linkage between context and process;

"This linkage is of key importance for understanding the impact of computer-based information systems in organizations, which are both constrained by the context in which they are developed and, in turn, are a factor in maintaining or altering that context."

Walsham goes on to discuss the application of structuration theory to the field of information systems within organizations. Walsham's approach is largely interpretivist, but commentators with a more socio-technical or systems based approach also accept the validity of this agenda. For example Sutton [25] provides the following conclusion.

"The classical. view of IT/IS as a supporter and follower of organizational objectives and needs is shown to be unduly conservative. Rather, at its most effective, IT/IS is an equal contributor to the identification of overall organizational goals and exploitation of strategic opportunities. We must guard against forms of words and institutionalisation of procedures which, however subtly, limit our thinking to the former viewpoint " (Sutton, 1998).

The two way process by which technological capability affects individuals and organizational choices, actions and their interpretations has been noted by many commentators. For example Dudley and Hassall [9] have developed this theme towards application in terms of understanding the various tensions around the implementation of a client database within a large organization [10]. Structuration itself has been employed as a framework for considering media choice, where technology is manipulated to perform work and has the result of reproducing or changing social context, Poole and DeSanctis [22], Yates and Orlikowski [27], (Most commonly noticeable in the way in which persons who might not normally interact at a social level within work may find themselves engaged in genial communication via EMail).

III. Experiences with Groupware

When new technology is introduced to the organization we might expect adjustments to occur to the modalities experienced by the users; and in turn for the organization to be affected by adjustments in the nature of interactions of the users. So, a way of seeking insights into the process of adoption of and adaptation to new technology is to look for evidence of adjustments in these modalities.

Considering this approach in more detail it seems clear that new technology is most easily associated with the *facilities* modality. Facilities, as has been seen, are processes, procedures and physical capabilities available to actors that are concerned with domination on the part of the organization and the exercise of power on the part of the user/actor. Indeed, we could say that power is exercised most often by actors within organizations through physical means to produce effects. In information systems for example, a facility may represent the way in which, on the one hand, individual users of a system are able to perform particular tasks (for example create an order for a product or service) and, on the other hand, the organization is enabled to constrain the capabilities of individual users to create more than a certain size of order without the intervention of another more privileged user. Most organizations explicitly split responsibilities for the commitment of physical resources and money between many different people; and the technological facilities which enable this are the specific information systems employed. The technology provides, and increasingly is, the physical manifestation of facilities which enable the balance between power for the individual and domination (regulation) by the organization. But what of the other modalities, interpretative schemes and norms? Can we show how information technology affects these?

During the period 1996 to 1998 a longitudinal study was conducted covering the introduction of Novell GroupWise (Rogers and McTague [24]), within an English County Council. A number of surveys were conducted during the process of data gathering, including data from a variety of departments across the Council. The main objective of the longitudinal study was to evaluate the effectiveness of the technology in changing the patterns of working and methods of performing particular business linked tasks.

The outcome of this work, including the development of several ways of evaluating groupware effect upon the organization based upon user judgements, is reported in Hassall (1999) [14]. Among the key findings of this research were the that patterns of use of the groupware technology were established early in implementation and did not show significant progressive development over time. This finding suggests that implementation of new technology on its own cannot easily bring about new ways of working, leading in turn to the need for further research into the socio-cultural context and the use of interpretative methods and schemes such as structuration. The current paper is a development based upon selected data from the study in which structuration is used to examine how adjustments to modalities may be taking place.

IV. Facilities

As already suggested, it is fairly easy to find evidence within the case data of changes to facilities introduced by the new groupware system. We have only to look at the business tasks for which the system was judged most useful by various respondents within the Social Services and Health department. (A single department has been selected based upon its high proportion of respondents, over 50%. However, conclusions from the surveys across all departments mirror those which are being drawn here.)

The impact of the groupware system in terms of providing access to others diaries together with the ability to schedule meetings is seen as important by both non managers and managers. In general it was found that the highest impact was felt in use of the system for those function where an explicit *designed* feature of the software was being employed. This was in contrasts to (again generally) disappointing use of the system for new and creative applications of the technology such as managing teams or organising shared work on reports and projects. So, a view is that with respect to the facility modality, there is a greater effect exerted on individuals actions and interactions than is occasioned by their actions in altering the form or mode of domination. The technological facilities provided will tend to reproduce and re-enforce existing patterns of power and control within the organization.

Task description	Staff		Managers	
	No.	%	No.	%
To inspect others diaries/own diary management	44	66%	11	52%
Message management	7	10%	1	5%
Sending documents as attachments	9	13%	6	29%
Accessing or sending broadcast information.	3	4%	1	5%
Scheduling meetings	34	51%	13	62%
Informal communications	39	58%	6	29%
Task List Management	20	30%	5	24%

Table 1, Business Tasks for which Groupware *Most Useful* (Adapted from Hassall, 1999, page 167.)

V. Interpretative Schemes

An example from the study in which the interpretative schemes may be discerned is the way in which the use of Email is viewed as a complement to, or in place of, other methods of communication. Part of the research study involved interviews with a total of 22 subjects covering a variety of areas in relation to the implemented groupware technology. Several people in the interviews expressed the opinion that Email offered a means of communication which was, (to paraphrase), *"...more formal than a conversation but less formal than a paper memo..."*. Several more, particularly managers, cited the ability to have a record that information had been communicated.

If a novel form of communication is introduced and made available to people within an organization, they must, in the absence of explicit instructions for use, determine for themselves when and for what to employ the communications medium. In the absence of prior experience, such a determination will be governed, partly at least, by the *anticipated* effect upon the receiver. So, the sender of email must make judgements which inevitably lead to a evolving interpretative scheme which, in time, is shared by other users within the organization. Wider experiences also suggest that such interpretative schemes can lead to widely differing Email cultures with the same technologies and within the same or similar types of organization. As an example, the author recently participated in an on-line conference group where the issue of whether contributions to the forum should be considered 'copyright' of the creator was raised. Some members of the group took up this issue and debated it in earnest... others (including the author) were perplexed by this issue, believing that the conference group was simply an electronically mediated 'virtual' discussion and the contributions, speech acts, subject to an informal interpretation.

VI. Norms

The evolution of norms of behaviours in relation to technical facilities provided, like the interpretative scheme,

can be complex. When deciding to implement a system comprising groupware technology managers within an organization may typically express a variety of aspirational objectives to be obtained. The aspirations for groupware products may be framed as a desire to develop new and more flexible ways of working, ways of sharing knowledge and developing 'virtual' teams, Orlikowski [20], [21], Hassall [14], [15]. In effect this represents an aim relating to the 'norming' or 're-norming' of behaviours around the new technological paradigm. But, as structuration would suggest, such an aim is far from easy to pursue in the light of the action/structure duality. In much the same way that different communications cultures will emerge around different interpretative schemes, so the development of the norm modality will exhibit a dynamic nature.

The dynamic shifts in the norm modality may be illustrated with further reference to *Table 1* and the differences in the responses of managers and non managers. Whereas 58% of non managers list informal communications as a most useful task, only 29% of managers do so. Moreover, the situation is reversed in the case of the use of document attachments, 29% of managers listing this as a most useful task and only 13% of non managers. The latter result undoubtedly reflects, at least in part, differences in the nature of managers and non managers jobs. However, it is also possible that these two items taken together are suggestive of a dialectic between the two groups. Possibly managers are more likely to articulate the use of GroupWise in a business connected and formal way; they seek to sanction its use for purposes directly linked to the business. Non managers by contrast, are not thinking of the use of the technology in as focused a fashion, but articulate its use and function in relation to a more social rather than business context.

VII. Implications for Practice

Based upon considerations of structuration theory, earlier work on systemic refocusing, Dudley and Hassall [9],[10], and results of surveys and case studies within various organizations, Hassall [15], it is considered that groupware systems aim to affect those modalities which dynamically determine the balance between interactions (work?) and structure(s) of organizations. Planning for successful implementation must recognise the power of this action and structure dynamic. But how should this problem be approached?

Often the problem of implementation of information systems is framed as that of defining requirements in sufficient technical detail and in a way that reflects organization socio-technical realities, Eason [11]. The particular situation with groupware and related products, including those now emerging on the Internet, is that (on the whole) they present technical *capabilities* rather than functions and applications directly to the end user actor, requiring he or she to model their working world in order to use them Orlikowski [20]. So, the focus for development may need to shift towards consideration of the end-user actors, their skills, aspirations and internal models, which may have far greater effect upon the overall organizational impact of new information technologies than any explicit technological capability that is introduced.

VIII. Discussion and Reflection

Structuration is a perspective that presents action (of persons within an organization) as partially constrained by and partially creating the structures (meanings, functions and norms) of the organization. At one level this is a common sense way of looking at the world and also of considering how technological mediation within an organization can affect, through the modalities of interpretative schemes, facilities and norms, how organizations are changed by technology.

The model encourages a view of organizations and technology which makes apparent the interconnected nature of technological capability and organizational and individual responses. As such it is a useful model, and one which is increasingly being cited within the information system research field Walsham [26], Champion [5], Hussain and Flyn [16].

In the case situation discussed it is clear that a variety of observations may be framed in terms of modalities, the specific ways in which signification, domination and legitemation are related to interpretation, power and sanction. So, we see electronic means of communication adjusting the interpretation of communicative events (the curious formality/informality of EMail); we appreciate how managers are provided with powerful facilities to schedule meetings and events by direct access to staff diaries and we witness signs of tension over the degree to which communications media should be employed for social functions at work as opposed to business functions. Structuration thus provides a way of framing and interpreting outcomes which illustrates and illuminates the interaction of technological capabilities with the socio-cultural environment of the organization.

IX. Conclusion

The theory of structuration has been presented as an interpretative framework in the case of implementation of groupware technology. The central conception of structuration, action and structure duality, is considered to represent a useful perspective for information systems and organizational research.

A number of specific examples of data extracted from a longitudinal study of groupware implementation have been discussed and interpretation attempted. The results show

that the theory of structuration can be useful for generating insights from such case data.

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